

REMARKS

Claims 1-26 are pending in the present application.

The present invention provides, in part, a bending apparatus for bending at least one glass sheet placed on a bending mold into a desired shape by heating in a furnace, which comprises a bending mold for placing at least one glass sheet thereon, a tunnel-like heating furnace through which the bending mold is conveyed, a first group of a plurality of heating elements fixed on an inner wall of the heating furnace, and a radiation-heating device having a second group of a plurality of heating elements placed separably from the inner wall surface of the heating furnace,

wherein said second group of a plurality of heating elements of said radiation-heating device are mounted on a structure that may be moved to increase or decrease the distance between said second group of a plurality of heating elements and said glass sheet,

wherein said second group of a plurality of heating elements of said radiation-heating device are disposed along the center line of said glass sheet or are disposed two-dimensionally, and

wherein the temperature of each heating element of said second group of a plurality of heating elements may be individually controlled (Claim 1).

Applicants submit that GB 836,560 (GB '560), individually or combined with Kamata, does not affect the patentability of the same for the following reasons.

The rejections of (a) Claims 1-4, 11, 12, and 17 under 35 U.S.C. §103(a) over GB '560, and (b) Claims 5, 13, 18, and 21 under 35 U.S.C. §103(a) over GB '560 in view of Kamata, are obviated in part by amendment and are traversed in part.

Applicants note that GB '560 fails to disclose or suggest (a) a *second* group of a plurality of heating elements that are mounted, and (b) the specifically claimed distribution of the *second* group of a plurality of heating elements.

In the presently claimed invention, a large number of heating elements, making up the “second group,” are mounted on the movable structure (e.g., the glass sheet-exposed surface of the rack as shown in Figures 2, 3, and 4 of the present application) each of which may be individually controlled. Accordingly, the apparatus of the present invention offers a second means by which the temperature distribution of the glass sheet may be controlled in addition to the distance between heat source and object: precise and individual control of the calorific power of each heating element.

By combining the two aforementioned means to control the temperature distribution of the glass sheet, the present apparatus eliminates the need to provide individual elevating devices (inclusive of control elements, such as a drive motor and control computer) for each heating element. Moreover, by mounting a large number of heating elements on a movable structure, the plurality of heating elements can be rapidly moved toward or away from the glass sheet in a single motion.

In contrast, GB '560 employs a series of heaters (designated as “88” in Figure 7) in a linear (one-dimensional) arrangement for local heating to facilitate bending to form a portion having a sharp curvature. This heater arrangement disclosed by GB '560 is used to selectively bend portions of the glass sheet that are difficult to bend by conventional heating

techniques. However, this limited local heating technique only provides for a limited scope of achievable shapes. More importantly, these local heaters do not provide a temperature distribution as in the present invention. As such, the heaters “88” disclosed by GB ‘560 do not correspond to the “second group of heating elements” recited in the claimed invention.

Moreover, the presently claimed invention provides for specific arrangements of said second group of a plurality of heating elements such that they are disposed along the center line of said glass sheet or are disposed two-dimensionally. For example, Figure 2 of the present application discloses that the heating elements denoted ① to ⑨ are disposed along the center line C of a glass sheet. Since each of the heating elements has a longitudinal shape disposed perpendicularly to the center line C and a wide area of the surface of a glass sheet is thus covered by the heating elements denoted ① to ⑨, the temperature distribution in the glass sheet can be precisely controlled by controlling the temperature of each of the heating elements. Figure 3 disclose an example of employing heating elements denoted ① to ⑤, while Figure 4 discloses an example in which heating elements denoted ① to ⑨ are employed as well as heating elements “a” and “d.” In each of these cases, the heating elements are disposed so as to cover most of the surface of the glass sheet and are disposed two-dimensionally.

As stated above, the heating elements disclosed in GB ‘560 are disposed in a one-dimensional orientation (see Figure 7). Therefore, GB ‘560 fails to disclose the claimed orientation of the *second* group of heating elements, even if heating elements “88” are construed as being equivalent to the claimed second group of heating elements.

Accordingly, GB ‘560 can not support a *prima facie* case of obviousness. MPEP §2142 states: “To establish a *prima facie* case of obviousness, three basic criteria must be

met. First, there must be some suggestion or motivation... to modify the reference... Second, there must be a reasonable expectation of success. Finally, the prior art reference... must teach or suggest all the claim limitations.”

Kamata is cited as disclosing that “heating elements having a heating plate have heater wires.” However, Kamata does not compensate for the aforementioned deficiencies in the disclosure of GB ‘560. Specifically, Kamata is also silent with respect to a *second* group of a plurality of heating elements that are mounted, and the specifically claimed distribution of the *second* group of a plurality of heating elements.

For the foregoing reasons, Applicants submit that the claimed invention is not obvious in view of GB 836,560 (GB ‘560), individually or combined with Kamata.

Applicants submit that the present application is now in condition for allowance.

Early notification of such action is earnestly solicited.

Respectfully submitted,

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